Pregnancy-Related Weight Gain and Retention: Implications of the 1990 Institute of Medicine Guidelines

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ABSTRACT

Objectives. Guidelines from the Institute of Medicine's 1990 report call for weight gains during pregnancy that are higher than those previously recommended. This study examines the potential implications of compliance with these guidelines for postpartum weight retention.

Methods. Weight retention 10 to 18 months following delivery was examined for selected women who had live births in the 1988 National Maternal and Infant Health Survey. Women's actual weight gains during pregnancy were retrospectively classified according to the Institute of Medicine's guidelines.

Results. Weight retention following delivery increased as weight gain increased, and Black women retained more weight than White women with comparable weight gain. The median retained weight for White women who gained the amount now being recommended was 1.6 lb whereas that for Black women was 7.2 lb.

Conclusions. If pregnant White women gain weight according to the institute's guidelines, they need not be concerned about retaining a substantial amount of weight postpartum. Our findings suggest, however, that Black women are in need of advice about how to lose weight following delivery. (*Am J Public Health.* 1993;83:1100–1103)

Introduction

During the first half of this century, weight gain guidelines during pregnancy were restrictive in the belief that obstetrical complications could thereby be avoided.[1] Since that time, such guidelines have become more liberal. In 1970, the National Academy of Sciences recommended a weight gain of 20 to 25 pounds.[2] In 1983, the first edition of *Guidelines for Perinatal Care*[3] called for a maternal weight gain of 22 to 27 pounds. And in a report issued in 1990,[4] the Institute of Medicine recommended a maternal weight gain of 25 to 35 pounds for women with normal weight for height. It appears as if medical guidelines are catching up with women's behavior. Already in 1980, the mean weight gain for pregnant women in the United States was 28.7 pounds[5]; by 1988, it was 31.6 pounds (based on unpublished tabulations from the 1988 National Maternal and Infant Health Survey).

The trend toward higher recommendations for weight gain during pregnancy is motivated by concerns about the weight and health of the infant.[4] However, apprehension about retaining weight after the baby is born may make the prospect of gaining more weight unattractive to some women. This paper examines the difference between women's prepregnancy and postpartum weights 10 to 18 months following delivery according to how much they gained during pregnancy. It also examines the implications of gaining weight according to the latest Institute of Medicine recommendations for women's postpartum weight. Recognizing that larger weight gains may be associated with subsequent obesity, the Institute of Medicine has identified this as an area where further research is needed.[4]

Methods

This analysis is based on the 1988 National Maternal and Infant Health Survey,[6] in which a systematic sample of women who had live births in 1988 was asked about prepregnancy weight, height, weight gain during pregnancy, and weight at the time of a postpartum interview. The response rates were 78.9% for White women and 70.2% for Black women. The response rates for unmarried and less educated women were lower than the average.

The sample was poststratified by mother's race, age, and marital status and by infant's birthweight, and ratio estimation procedures were used to produce national estimates. These estimates are representative of women aged 15 years and older who had a live birth in the United States in 1988 within race, age, marital status, and birthweight strata. The representativeness of estimates by social and economic factors is improved to the extent that such factors are associated with the race, age, marital status, and birthweight categories used in the poststratification.

This analysis is limited to women who were interviewed 10 to 18 months following delivery. At least 9 months was allowed for women to reach their appropriate weight. Among women interviewed after 18 months, increases in retained weight were evident. These increases may

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have been due to increases in weight associated with age. However, although women gain, on average, slightly less than 1 pound per year with aging,[7] weight gain associated with aging for women who do not become pregnant is unknown. Therefore, no attempt was made in this analysis to adjust for weight increases due to the aging process.

To exclude reduced weight gain associated with short gestation, this analysis is also limited to women whose pregnancies lasted 37 weeks or longer. It is further restricted to women who had singleton live births and to women who did not become pregnant again before the interview. Very obese women (those with a body mass index greater than 29.0, as discussed below) were also excluded because the Institute of Medicine set no upper weight gain limit for them. There were too few women of races other than White or Black to support a separate analysis for these groups. These findings are based on 1599 White women who represent 1 322 820 White women and on 1345 Black women who represent 205 507 Black women aged 15 years and older who had live births in 1988.

Although breast-feeding is generally associated with more rapid postpartum weight loss,[8] women who breast-fed were not excluded from this study. In this sample, the effect of breast-feeding on weight retention was only manifested among women who breast-fed for 4 months or more. The proportion of women in this study who breast-fed for this length of time was too small to have any substantial affect on this analysis.

The data are analyzed according to the Institute of Medicine's 1990 weight gain guidelines for pregnant women, which for the first time take prepregnancy weight and height into account. The body mass index (weight in kilograms/height in meters squared × 100) has been found to be a better indicator of nutritional status than weight alone.[4] Based on these guidelines, "underweight" women (body mass index < 19.8) should be advised to gain 28 to 40 pounds during pregnancy; "overweight" women (body mass index = 26.1 to 29.0), 15 to 25 pounds; and "normal" weight women (body mass index = 19.8 to 26.0), 25 to 35 pounds. A lower limit of 15 pounds was proposed for very obese women (body mass index > 29.0), but no upper limit was stated.

To examine the difference between women's prepregnancy and postpartum weights, this study relies on women's self-reported weight, which is subject to heaping at even numbers and at 5-pound intervals, to rounding, to recall error, and perhaps to wishful thinking. Studies of self-reported weight indicate that women underestimate their weight by about 2 pounds.[9] In the absence of information to the contrary, it is assumed, that any biases in the reporting of prepregnancy weight are similar to biases in the reporting of weight at delivery and weight at the time of the postpartum interview. If this is true, the differences between prepregnancy weight and weight at delivery and between prepregnancy weight and weight 10 to 18 months after delivery would be relatively unbiased. There is evidence that there is no difference in reporting bias for self-reported weights between White and Black women.[10]

For the purposes of this analysis, women are classified according to their body mass index. This measure of relative weight for height relies on women's self-reported height as well as weight. Women 20 to 44 years of age report their height quite accurately.[9] The tendency to underestimate weight would result in some misclassification into a lower body mass index category; however, the extent of such misclassification is unknown.

The women in this study completed their pregnancies before the 1990 Institute of Medicine recommendations were issued. In this study, the actual weight gain of women in the 1988 survey was retrospectively classified according to whether the women gained the recommended amount, less than the recommended amount, or more than the recommended amount for their body mass index. Thus, the potential implications of compliance with these weight gain guidelines for postpartum weight retention could be examined.

Results

Table 1 presents distributions of the difference between prepregnancy and postpartum weights according to the Institute of Medicine's weight gain guidelines. For ease of reference, the difference is referred to as "retained weight." Information for all races combined is provided for completeness; however, because there are significant differences in retained weight for White and Black women, the discussion is focused on these two groups.

Among White women interviewed 10 to 18 months after delivery, 56% were fewer than 4 pounds over their prepregnancy weight, compared with 37% of Black women. At the upper end of the distribution, 25% of White women compared with 45% of Black women retained 9 or more pounds.

The pattern of weight retention according to the Institute of Medicine's guidelines was quite similar for White and Black women. For both races in all three weight/height groups, the percentage who retained fewer than 4 pounds tended to decrease as weight gain during pregnancy increased. Similarly, additional weight gain resulted in higher proportions of mothers retaining at least 9 pounds.

Because the patterns of retained weight by recommended weight gain categories were so similar for the three weight/height groups, we collapsed categories, as shown in Table 2. Here, women are categorized according to whether their weight gain was less than recommended, as recommended, or more than recommended for their respective weight/height group.

Among White women who gained less than the recommended amount, 65% retained fewer than 4 pounds, not significantly higher than the proportion who gained as recommended (60%). However, among those who gained more than recommended, only 45% retained fewer than 4 pounds. About the same proportion of those who gained less than recommended or as recommended retained at least 9 pounds (almost 20%). However, among those who gained more than recommended, 35% retained this much weight. The median retained weight increased from 0.9 pounds for those who gained less than recommended, to 1.6 pounds for those who gained as recommended, to 4.9 pounds for those who gained more than recommended.

Among Black women who gained less than the recommended amount, 50% retained fewer than 4 pounds, but this declined to 35% for those who gained as recommended and to 25% for those who gained more than recommended. The percentage of Black women who retained 9 or more pounds increased with weight gain from 29% for those who gained less than recommended, to 45% for those who gained as recommended, to 61% for those who gained more than recommended. The median weight retention for Black women increased from 3.4 pounds for those gaining less than recommended, to 7.2 pounds for those gaining as recommended, to 12.7 pounds for those gaining more than recommended.

The associations described above were not substantially affected when controls for parity, breast-feeding, or working

TABLE 1—Number and Percent Distribution of Mothers, by Retained Weight after Delivery, United States, 1988

Mother's Body Mass Index[a] and Weight Gain	Number (in thousands)	Lost Weight	Retained Weight, lb					
			0–3	4–8	9–13	14 or More	Less Than 4	9 or More
All races[b]								
Total	1592	24.9	28.2	19.0	12.2	15.7	53.1	27.9
Low index								
<28 lb	158	27.9	34.3	17.4	14.0	6.4[c]	62.2	20.4
28–40 lb	163	17.0	38.3	20.5	13.8	10.4	55.3	24.2
>40 lb	95	14.3[c]	29.6	19.0[c]	12.7[c]	24.4	43.9	37.1
Average index								
<25 lb	272	33.1	29.9	15.4	11.4	10.2	63.0	21.6
25–35 lb	370	28.9	28.9	22.1	8.9	11.2	57.8	20.1
>35 lb	382	16.9	24.4	20.5	14.7	23.5	41.2	38.2
High index								
<15 lb	21	43.1[c]	17.3[c]	13.8[c]	10.5[c]	15.3[c]	60.3	25.8[c]
15–25 lb	34	31.6[c]	18.0[c]	14.0[c]	22.2[c]	14.1[c]	49.7	36.3
>25 lb	98	30.1[c]	14.1[c]	14.3[c]	7.7[c]	33.8	44.2	41.6
White								
Total	1323	26.3	29.6	18.8	11.7	13.6	55.9	25.3
Low index								
<28 lb	122	29.4	33.2	17.0[c]	14.2[c]	6.1[c]	62.7	20.3[c]
28–40 lb	138	18.4[c]	41.6	17.5[c]	14.0[c]	8.5[c]	60.0	22.5
>40 lb	82	14.2[c]	31.9	18.0[c]	12.7[c]	23.2[c]	46.1	35.9
Average index								
<25 lb	212	35.6	30.8	14.1	10.2[c]	9.3[c]	66.4	19.5
25–35 lb	320	31.0	30.2	22.6	8.7	7.6	61.1	16.2
>35 lb	327	17.4	26.5	21.3	13.9	20.9	43.9	34.8
High index								
<15 lb	14	45.8[c]	19.1[c]	15.2[c]	6.1[c]	13.7[c]	64.9[c]	19.9[c]
15–25 lb	27	34.9[c]	19.7[c]	9.8[c]	25.0[c]	10.6[c]	54.6[c]	35.6[c]
>25 lb	81	34.1	14.1[c]	14.4[c]	7.0[c]	30.4	48.2	37.4
Black								
Total	206	16.6	20.4	18.3	14.0	30.7	37.1	44.7
Low index								
<28 lb	23	15.0[c]	39.0	21.4	13.5[c]	11.1[c]	54.1	24.5
28–40 lb	14	10.8[c]	23.4[c]	21.3[c]	9.7[c]	34.7[c]	34.3	44.5
>40 lb	9	10.4[c]	16.6[c]	14.3[c]	16.8[c]	41.9[c]	26.9[c]	58.8
Average index								
<25 lb	48	24.3	24.2	20.6	15.9	15.1	48.4	30.9
25–35 lb	40	15.5	18.9	20.1	11.3[c]	34.2	34.4	45.5
>35 lb	45	12.8	12.5	15.5	16.4	42.9	25.3	59.3
High index								
<15 lb	4	30.5[c]	18.2[c]	15.1[c]	9.1[c]	27.2[c]	48.7[c]	36.3[c]
15–25 lb	7	22.3[c]	13.8[c]	19.6[c]	13.7[c]	30.6[c]	36.1[c]	44.3[c]
>25 lb	15	12.4[c]	10.3[c]	9.5[c]	12.3[c]	55.5	22.6[c]	67.8

Note. Because of rounding, figures may not add to totals.
[a]Weight in kilograms/height in meters squared × 100.
[b]Includes races other than White and Black.
[c]Figure does not meet standards of reliability or precision because of small sample size (<30) or relative standard error of 25% or greater.

status were introduced. Further research is planned, however, on the independent effects of these variables on weight retention.

Discussion

This study is based on the self-reported prepregnancy and postpartum weights of women giving birth shortly before the Institute of Medicine's 1990 weight gain guidelines were published. If prenatal care providers now begin to recommend these guidelines, and if women comply, we could expect weight retention postpartum to be similar to that of women in this study. The experience of White women who had full-term live births in 1988 provides some reassurance for White women who might have concerns about how much weight they will gain during pregnancy. The median difference between prepregnancy and postpartum weight was 2.3 pounds. Six out of 10 White women who gained the Institute of Medicine's recommended amount for their weight and height retained fewer than 4 pounds, and the median amount of weight retained for these women was 1.6 pounds. White women who gained more than the recommended amount substantially increased their chances of retaining 9 or more pounds compared with those who gained less, and the median retained weight for these women was 4.9 pounds.

Black women were more likely to retain weight than White women. The median retained weight for Black women was 7.0 pounds, three times that of White women. As noted earlier, 45% of Black women compared with 25% of White women retained 9 pounds or more. The median retained weight for Black women also increased as weight gain increased.

The findings for Black women are of particular concern in the context of what we know about weight gain for these women. First, a relatively large proportion do not gain enough weight during pregnancy. Since 1974, the American College of Obstetricians and Gynecologists has recommended weight gains of 22 to 27 pounds.[12] However, in 1988, among women with full-term live births, 34% of Black women gained fewer than 22 pounds, compared with 21% of White women (based on unpublished tabulations from the 1988 National Maternal and Infant Health Survey). Second, in 1988, Black women were more likely to report being told to gain less than the amount recommended at the time (22 to 27 pounds) than were their White counterparts with a comparable body mass index.[11] Third, there is an association between weight gain advice and actual weight gain,[11] which suggests that women can be successfully encouraged to gain an optimum amount during pregnancy. Clearly, Black women need to be made aware of these latest weight gain recommendations. This study suggests that, in addition to advice about how much to gain during pregnancy, Black women also need advice about how to lose weight following delivery.

Finally, a note on the latest weight gain recommendations themselves is in order. In this analysis, the pattern of retained weight associated with these weight gain recommendations is similar for the three weight/height groups for women of both races. The consistency of this pattern suggests that the latest weight gain recommendations based on a woman's body mass index have some external validity in terms of postpartum weight retention.

TABLE 2—Number and Percent Distribution of Mothers, by Retained Weight after Delivery and Correspondence with Institute of Medicine's 1990 Weight Gain Guidelines, United States, 1988

Mother's Race and Weight Gain	Number (in thousands)	Lost Weight	Retained Weight, lb						
			0–3	4–8	9–13	14 or More	Less than 4	9 or More	Median, lb
All races[a]	1592	24.9	28.2	19.0	12.2	15.7	53.1	27.9	2.9
Less than recommended	450	31.8	30.8	16.0	12.3	9.1	62.6	21.4	1.2[b]
As recommended	568	25.6	31.0	21.1	11.1	11.1	56.6	22.3	2.2
More than recommended	575	18.7	23.5	19.2	13.2	25.4	42.2	38.6	5.6
White	1323	26.3	29.6	18.8	11.7	13.6	55.9	25.3	2.3
Less than recommended	348	33.9	31.2	15.2	11.4	8.3	65.0	19.8	0.9[b]
As recommended	485	27.6	32.8	20.5	11.1	8.0	60.4	19.1	1.6
More than recommended	491	19.6	25.3	19.6	12.5	22.9	45.0	35.4	4.9
Black	206	16.6	20.4	18.3	14.0	30.7	37.1	44.7	7.0
Less than recommended	76	21.8	28.4	20.5	14.7	14.5	50.2	29.3	3.4
As recommended	60	15.1	19.4	20.3	11.2	33.9	34.6	45.1	7.2
More than recommended	69	12.4	12.6	14.0	15.6	45.5	24.9	61.1	12.7

Note. Because of rounding, figures may not add to totals.
[a]Includes races other than White and Black.
[b]Figure does not meet standards of reliability or precision because of small sample size (<30) or relative standard error of 25% or greater.

This lends support to the appropriateness of different weight gain recommendations based on prepregnancy weight and height. □

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